# INFORMATION SHEET

ORDER NO. R5-2004-
INDIAN VALLEY HEALTH CARE DISTRICT
GEOTHERMAL SPACE HEATING PROJECT
PLUMAS COUNTY

## GENERAL INFORMATION

The Indian Valley Health Care District (hereafter Discharger) submitted a Report of Waste Discharge, dated 19 November 2003, and applied for a permit renewal to discharge waste under the National Pollutant Discharge Elimination System (NPDES) from a geothermal heating system at the Indian Valley Health Care District Hospital.

The Discharger discharges wastewater from a geothermal space heating system into a surface drain which in turn discharges to Wolf Creek, a water of the United States, at a point in Section 2, T26N, R9E, MDB&M (latitude 40° 8' 22" and longitude 120° 55' 50") as shown on Attachment A. Hot water, (115°F), from the geothermal well, which is housed in a wooden shed to the southeast of the front entrance, enters a heat exchanger and is then discharged to a sub grade 4-inch Schedule 40 PVC pipe which passes under Hot Springs Road and eventually discharges to an open drainage ditch approximately 750 feet to the south. The drainage ditch flows south for approximately 250 feet before entering Wolf Creek. From approximately 15 May to 15 November there is no upstream flow in the drainage ditch. The Discharger uses geothermal heat for space heating only so there is no usage or discharge from mid May to mid September.

The report of waste discharge and past monitoring describe the geothermal discharge as follows:

| | |
|---|---|
| Average Winter Flow | 50 gpm |
| Maximum Flow | 80 gpm |
| Average Summer Flow | 5 gpm |
| Average Temp. (outfall) | 90° to 100° F |
| pH | 8.8 |
| Specific Conductance | 1,050 µS/cm |
| TDS | 625 mg/L |
| Chloride | 240 mg/L |
| Fluoride | 4,600 µg/L |
| Boron | 4,800 µg/L |

Wolf Creek discharges to Indian Creek which discharges to East Branch North Fork Feather River, which discharges to North Fork Feather River. The site lies within the Crescent Mill Hydrologic Unit No. 518.53 as defined on interagency hydrologic maps prepared by the State Department of Water Resources.

Prior to approximately 1955 Wolf Creek was a shallow willow-lined stream narrow enough to jump across in many places, but erosion from a number of human activities including creation of paved surfaces, urbanization, timber harvest, dam failures and various streambed alterations have created a braided stream channel over 40 feet wide in places with a sediment yield of 41,000 tons per year. In response to the erosion problems the Wolf Creek Restoration Project was initiated in 1987. As part of the project a continuously recording staff gauge was installed at the Main St. Bridge in Greenville.

Flows and temperatures in Wolf Creek supplied by the U.S. Forest Service are as follows:

| Month | Flow (gpm) | Ave. Temp. (°F) |
|---|---|---|
| January | 25,523 | 39.2 |
| February | 60,380 | 39.2 |
| March | 47,579 | 44.6 |
| April | 60,991 | 42.8 |
| May | 38,090 | 55.4 |
| June | 9,818 | 64.4 |
| July | 4,221 | 57.2 |
| August | 2,814 | 66.2 |
| September | 3,029 | 60.8 |
| October | 4,140 | 51.8 |
| November | 4,827 | 44.6 |
| December | 34,160 | 39.2 |

Flow data for individual days indicates that the minimum flow during the period of discharge between 15 September and 15 May is approximately 2.0 cfs (897.6 gpm).

## BENEFICIAL USES

The Basin Plan on page II-2.00 states that: "Existing and potential beneficial uses which currently apply to surface waters of the basins are presented in Figure II-1 and Table II-1. The beneficial uses of any specifically identified water body generally apply to its tributary streams." The Basin Plan does not identify any beneficial uses specifically for Wolf Creek and its tributaries, but the Basin Plan does identify present and potential beneficial uses for the North Fork Feather River, to which Wolf Creek and Indian Creek are tributary.

The Basin Plan identifies the following beneficial uses for the North Fork of the Feather River: municipal and domestic supply (MUN); hydropower generation (POW); water contact recreation and canoeing and rafting (REC-1); non-contact recreation (REC-2); cold freshwater habitat (COLD); cold water spawning, reproduction, and/or early development (SPWN); and wildlife habitat (WILD). In addition, SWRCB Resolution No. 88-63 ("Sources of Drinking Water

Policy"), incorporated into the Basin Plan pursuant to Regional Board Resolution No. 89-056, requires the Regional Board to assign the municipal and domestic supply use to water bodies that do not have beneficial uses listed in Table II-1. Upon review of the flow conditions, habitat values, and beneficial uses of Wolf Creek and its tributaries, the Regional Board finds that the beneficial uses identified in the Basin Plan for the North Fork Feather River are applicable to Wolf Creek and its tributaries as discussed below. The Basin Plan defines beneficial uses and with respect to disposal of wastewaters states that "...disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses."

*a. Municipal and Domestic Supply, Agricultural Supply, Industrial Service Supply*

The SWRCB has issued water rights to existing water users along Wolf Creek and its tributaries and the Feather River downstream of the discharge for multiple uses including domestic, agricultural, and industrial service supply. Since the flow in Wolf Creek and its tributaries is greatly reduced in the summer months, these streams likely provide groundwater recharge during periods of low flow. Domestic water supply in the area is generally provided by municipal entities using treated surface water. Although the use of area groundwater as domestic supply is limited, the potential for expanded use exists. In addition to the existing water uses, growth in the area downstream of the discharge is expected to continue, which presents a potential for increased domestic, agricultural, and industrial uses of groundwater and the water in Wolf Creek and its tributaries. The Basin Plan states that "Water Bodies within the basins that do not have beneficial uses designated in Table II-1 are assigned MUN designations in accordance with the provisions of State Water Board Resolution No. 88-63 which is, by reference, a part of this Basin Plan." SWRCB Resolution No. 88-63 provides that "All surface and ground waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards…". The beneficial use of municipal and domestic supply is applicable to Wolf Creek and its tributaries based on Resolution No. 88-63, the Basin Plan tributary rule, and actual uses.

*b. Hydropower Generation, and Navigation*

Although no records of existing hydropower generation and navigation uses were found on Wolf Creek and its tributaries, these uses do exist in the North Fork Feather River to which Wolf Creek and Indian Creek are tributary. The very nature of these uses depends on the presence of flow from tributary streams and therefore these uses are protected by including them as beneficial uses in streams tributary to the North Fork Feather River. Furthermore, considering the likely future value of electricity generation, it is not unreasonable to expect that new technologies for small hydropower projects may make hydropower generation uses on Wolf Creek or its tributaries desirable.

*c. Water Contact and Noncontact Recreation*

The Regional Board finds that Wolf Creek and its tributaries flow through rural and residential areas and that there is ready public access. Contact and noncontact recreational activities exist and are likely to increase if the population in the area grows. Prior to discharge into Indian Creek and North Fork Feather River, Wolf Creek flows through areas of general public access. North Fork Feather River also offers recreational opportunities.

*d. Cold Freshwater Habitat, Migration of Aquatic Organisms, Spawning, Reproduction, and/or Early Development, and Wildlife Habitat*

Wolf Creek flows to Indian Creek, which is tributary to the North Fork Feather River. Fish species present in Indian Creek, Wolf Creek and their tributaries are consistent with cold water fisheries. There is no potential for anadromous fish migration beyond Lake Oroville and associated beneficial uses, therefore, do not apply to Wolf Creek. The Basin Plan (Table II-1) designates the North Fork Feather River as being a cold freshwater habitat. Therefore, pursuant to the Basin Plan (Table II-1, Footnote (2)), the cold designation applies to Wolf Creek and its tributaries. The cold water habitat designation necessitates that the in-stream dissolved oxygen concentration be maintained at, or above, 7.0 mg/L. The riparian areas along Wolf Creek and its tributaries support wildlife habitat.

*e. Groundwater Recharge, and Freshwater Replenishment*

In areas where groundwater elevations are below the stream bottom, water from the stream will percolate to groundwater. During the summer months the local water table is well below the stream bottom of Wolf Creek as evidenced by drillers logs in the area. During these months it is reasonable to assume that water in Wolf Creek is percolating to the soil layers below and eventually reaching groundwater. There is hydraulic continuity between Wolf Creek and North Fork Feather River throughout the entire year. Wolf Creek and its tributaries, therefore, add to the water quantity and may impact the quality of water flowing down stream to North Fork Feather River.

Based on hydraulic continuity, existing and potential water rights, the potential for hydroelectric power generation, the presence of contact recreational activities, aquatic life migration, potential spawning and reproduction, and the presence of nearby wildlife habitat, the beneficial uses of the North Fork of the Feather River apply to Wolf Creek and its tributaries.

The beneficial uses of groundwater are municipal and domestic supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO).

## WATER QUALITY CONTROL PLAN, NATIONAL TOXICS RULE, AND CALIFORNIA TOXICS RULE

The Regional Board adopted a *Water Quality Control Plan*, *Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and describes an implementation program and policies to achieve water quality objectives for all waters of the Basin. This includes plans and policies adopted by the State Water Resources Control Board (SWRCB) and incorporated by reference, such as Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (Resolution No. 68-16). These requirements implement the Basin Plan. The Basin Plans, as amended, designate beneficial uses, establish water quality objectives, and contain implementation plans and policies for waters of the Basins. Pursuant to the California Water Code (CWC) Section 13263(a), waste discharge requirements must implement the Basin Plans.

The discharge as permitted herein is consistent with the provisions of State Water Resources Control Board Resolution No. 68-16. Geothermal water is pumped directly from the well to the heat exchanger and then to the 4 inch schedule 40 PVC pipe which discharges to the drain going to Wolf Creek. There is no opportunity for leaching to groundwater except in the short section of drain which is not used in the summer when the infiltration rate would be highest. There are no additives except the lubrication oil for the pump. In consideration of the conditions at the facility there are no additional requirements for a groundwater monitoring program.

U.S. EPA adopted the *National Toxics Rule* (NTR) on 22 December 1992, which was amended on 4 May 1995 and 9 November 1999, and the *California Toxics Rule* (CTR) on 18 May 2000, which was amended on 13 February 2001. These Rules contain water quality standards applicable to this discharge. The SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP) on 2 March 2000, which contains policies and procedures for implementation of the NTR and the CTR.

## EFFLUENT LIMITATIONS AND REASONABLE POTENTIAL

Federal regulations at 40 CFR 122.44(d)(1) require effluent limitations for all pollutants that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an in-stream excursion above a numeric water quality criterion (such as CTR criterion) or a narrative water quality criterion within a State water quality standard. These regulations also set forth a methodology for establishing effluent limitations based on narrative state water quality criteria [40 CFR 122.44(d)(1)(vi)(A-C)].

On 11 December 2000, the Discharger was issued a letter under the authority of California Water Code, Section 13267 requesting effluent and receiving water monitoring to meet the requirements of the State Implementation Policy (SIP). The Discharger has sampled the

geothermal discharge and the receiving water once on 24 December 2003 to determine if the priority pollutants established in the CTR and NTR were detected. Analytical results were submitted for volatile substances, semi-volatile substances, pesticide compounds, metals, asbestos, 2,3,7,8 TCDD and its congeners, and seventy-four priority pollutant organic substances. The methodology described in Section 1.3 of the SIP was used to evaluate the Discharger's monitoring data. None of the priority pollutants were detected at concentrations that would cause or contribute to an in-stream excursion above a water quality objective. Based on CTR results and Facility operations, the Regional Board finds that the discharge does not have a reasonable potential to cause or contribute to an in-stream excursion above the CTR objectives for priority pollutants. Effluent limitations for priority pollutants have not been included in this Order.

On 12 May 2004 Staff conducted an inspection of the facility and sampled effluent and receiving water. Effluent was sampled at the discharge from the 4 inch PVC line. R-1 was sampled approximately 50 feet upstream of the discharge and R-2 was sampled approximately 500 feet downstream of the discharge, immediately upstream of the sewage treatment ponds. Results were as follows:

| Constituent | Units | Discharge | R-1 | R-2 |
|---|---|---|---|---|
| pH | | 9.23 | 7.65 | 7.78 |
| TDS | mg/l | 550 | 47 | 77 |
| E.C. | uS/cm | 1,050 | 126 | 143 |
| Arsenic | µg/L | 5 | 4 | 2 |
| Fluoride | µg/L | 4220 | 120 | 210 |
| Boron | µg/L | 5920 | 39 | 138 |

Arsenic, a priority pollutant, has been detected in the effluent at a maximum concentration of 5 ug/L, which is below the applicable receiving water objective of 10 ug/L.

Boron is not a priority pollutant, however, Boron has been detected in the effluent at a maximum concentration of 5920 µg/L. The applicable water quality goal is 700 µg/L, which is the agricultural water quality objective. The upstream receiving water concentration was reported as 39 ug/L.

Fluoride, which is not a priority pollutant, has been detected in the effluent at a maximum concentration of 4,600 µg/L. The applicable water quality goal for fluoride is the California primary maximum contaminant level for drinking water, (MCL), and the USEPA secondary MCL, both of which are 2,000 µg/L.

Three species toxicity testing with Fathead Minnow, Ceriodaphnia dubia, and Selenastrum capricornutum at 100%, 50%, 25%, 12.5% and 6.25% dilutions indicated the only statistically

significant effect was a reduction in Selenastrum growth for 100%, 50%, and 25% effluent. No reduction occurred at the 12.5% dilution in laboratory water.

Maximum concentrations of pollutants in receiving water as a result of the discharge are most likely to occur in September, October and November when usage of geothermal fluid is relatively high and flow rates in Wolf Creek are lower. At the instantaneous maximum effluent flow of 83 gpm (0.12 mgd) and at the minimum flow in Wolf Creek (897.6 gpm) the dilution would be approximately 10.8:1 receiving water to effluent. Based on the results of the above sampling and flow conditions in Wolf Creek, this permit prohibits discharge where receiving water dilutions are less than 10:1 receiving water to effluent. These waste discharge requirements include daily monitoring for effluent flow during discharge and daily monitoring of flow in Wolf Creek flow in Wolf Creek and effluent flow. The Discharger is required to adjust effluent flow on a daily basis to insure a minimum 10:1 dilution.

The Basin Plan states that, "The pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses." This Order requires the effluent pH to remain between 6.0 and 9.0 units, which is protective of receiving waters due to available dilution in the Creek. This effluent limit is consistent with the limit in the previous permit.

The Basin Plan contains narrative standards for toxicity. The Basin Plan states that, "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal or aquatic life. … In addition effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate." This order requires the Discharger to conduct annual testing for acute toxicity by a 96-hour static bioassay using Fathead Minnow. The minimum survival of test fishes in a 96-hour static bioassay of pure effluent for a single test is 70 %. The median survival for any three or more consecutive tests is 90 %. These limits are consistent with, or exceed the limits in the previous Order. A three species chronic bioassay is required once during the life of the permit.

Electrical conductivity measured in the geothermal discharge exceeds 1,000 umhos/cm. The Basin Plan objective for electrical conductivity in the North Fork of the Feather River is 150 umhos/cm (as the $90^{th}$ percentile), although not explicitly related to a beneficial use. Monitoring of the receiving water indicates electrical conductivity periodically exceeds 150 umhos/cm in Wolf Creek below the discharge. However, no monitoring data is available for Wolf Creek above the discharge. Although it has been determined that the beneficial uses of Wolf Creek and its tributaries are identical to those of the River, exceedance of the water quality objective for conductivity applicable to the North Fork of the Feather River would not result in the impairment of Wolf Creeks Creek's beneficial uses. The Order requires monitoring of electrical conductivity in Wolf Creek upstream and downstream of the discharge. This Order contains a receiving water limitation that states the Discharger shall not cause an increase in conductivity in the North Fork of the Feather River above 150 umhos/cm.

## RECEIVING WATER LIMITATIONS

The receiving water limitations contained in the draft Order are based on water quality objectives contained in the Basin Plan for the North Fork of the Feather River.

## MONITORING AND REPORTING PROGRAM

Section 308 of the CWA and U.S. EPA regulation 40 CFR 122.44 (i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality. Receiving water monitoring requirements are based on the Basin Plan and authorized by California Water Code Section 13383. The self-monitoring program requires monitoring of receiving water and effluent.

The Monitoring and Reporting Program includes monitoring of the effluent and receiving water for flow, pH, temperature, specific conductivity, total dissolved solids, boron and fluoride, and it includes visual monitoring of conditions upstream and downstream of the point of discharge. Acute toxicity monitoring of the effluent is required to assure compliance with the effluent limitation for toxicity in the Order. One time in the five year life cycle of the permit chronic toxicity monitoring is required to determine if the effluent is contributing toxicity to the receiving water. One time in the five year life cycle of the permit, receiving water must also be monitored, concurrently with effluent, for the CTR priority pollutant metals.

## PROCEDURES ON REACHING FINAL DECISION ON DRAFT PERMIT

The tentative waste discharge requirements have been sent to the Discharger and interested parties for review (at least 30 days) prior to formal presentation to the Regional Board. Any contested items on the permit will be heard and considered for change prior to formal adoption at the Board Meeting.